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# (12) United States Patent

Vayanos et al.

## (54) OUTER CODING METHODS FOR BROADCAST/MULTICAST CONTENT AND RELATED APPARATUS

(75) Inventors: Alkinoos Hector Vayanos, San Diego,

CA (US); Francesco Grilli, San Diego,

CA (US)

(73) Assignee: QUALCOMM Incorporated, San

Diego, CA (US)

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See application file for complete search history.

## (56) References Cited

### U.S. PATENT DOCUMENTS

4,901,307 A 2/1990 Gilhousen et al. 4,907,307 A 3/1990 Weitzler 5,103,459 A 4/1992 Gilhousen et al.

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US 8,291,300 B2 Oct. 16, 2012

5,257,399 A	10/1993	Kallin et al.
5,305,311 A	4/1994	Lyles
5,371,734 A	12/1994	Fischer
5,404,355 A	4/1995	Raith
5,432,800 A	7/1995	Kuroda et al.
5,504,773 A	4/1996	Padovani et al.
5,537,410 A	7/1996	Li
5,557,614 A	9/1996	Sandler et al.
5,563,895 A	10/1996	Malkamaki et al.
(Continued)		

### FOREIGN PATENT DOCUMENTS

CN 1194748 A 9/1998 (Continued)

### OTHER PUBLICATIONS

"Xu Bo, "Throughput Performance Analysis for GPRS," Tianjin Communications Technology, CN, No. 3, Sep. 2001, pp. 18-24,".

(Continued)

Primary Examiner — Guy Lamarre (74) Attorney, Agent, or Firm — Roberta A. Young; John J. Ketchum

#### (57) ABSTRACT

Transmission techniques are provided that improve service continuity and reduce interruptions in delivery of content that can be caused by transitions that occur when the User Equipment (UE) moves from one cell to the other, or when the delivery of content changes from a Point-to-Point (PTP) connection to a Point-to-Multipoint (PTM) connection in the same serving cell, and vice-versa. Such transmission techniques enable seamless delivery of content across cell borders and/or between different transmission schemes such as Point-to-Multipoint (PTM) and Point-to-Point (PIP). Mechanisms for adjusting different streams and for recovering content from each data block during such transitions are also provided so that data is not lost during a transition. In addition, mechanisms for realigning data during decoding at a receiving terminal are also provided.

### 6 Claims, 24 Drawing Sheets

